

Bulb Crushing Machine Design Flaw Exposes Workers to Mercury

The Challenge

The CT Department of Public Health received a report of elevated mercury in the urine of a worker at a recycling plant. The facility where this person worked recycles between 5,000 and 60,000 used mercury-containing light bulbs per day, utilizing a machine specifically designed for this purpose. The recycling process produces mercury vapors, which are intended to be captured by a local exhaust ventilation system attached to the recycling machine. The elevated mercury level in one worker suggested that overexposures were occurring during the recycling process and that other workers might also be at risk in this plant and similar ones across the country.



A design flaw in the bulb processing machine exposed workers to dangerously high mercury levels in the air.

The Response

The CT DPH's Occupational Health Program conducted an investigation at the plant including a review of the plant's safety policies and observations of employees on the job. Since the company had not previously measured employees' personal exposure to mercury, air sampling was done while workers performed routine tasks such as loading bulbs onto/into recycling machines, unclogging machines, handling/transporting lamp byproducts, and servicing machines. Breathing zone sampling results for an employee who was actively unclogging the recycling machine showed extremely high levels of mercury ($>200 \mu\text{g}/\text{m}^3$). This process involved clearing clogged bulbs from the crusher several times per processing shift and required a panel on the top of the machine to be opened to access the crusher auger. However, this panel also incorporated the local exhaust vent designed to capture mercury vapors, and, when the access door was opened, the local exhaust ventilation was effectively removed.

The Impact

As a result of these observations, several recommendations were made to the employer for changing processes and modifying controls to further protect workers at the facility. A key recommendation was to relocate the local exhaust vent serving the bulb crusher compartment off the access door so that it remains operationally intact when the door is opened. Investigators also communicated this design flaw and the redesign recommendation to the machine manufacturer. A manufacturer recall and/or reconfiguration of machines of this and other similar models would thus increase protection of workers at other facilities doing similar recycling work.

For more information, visit the Connecticut Occupational Health Unit Website:

<http://www.ct.gov/dph/occupationalhealth>